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Different household – different inflation rate

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Households differ considerably in terms of the inflation they experience at any point in time. The main reasons for this are that prices (and thus price changes) differ from place to place and that households do not all buy the same products. Households adjust their purchases over time, but not enough to offset these differences.

Sources of inflation rate dispersion across households

The differences between households in terms of their exposure to inflation have gained a lot of attention, especially since the recent jump in the cost of living. Their different inflation experiences feed into different inflation perceptions and expectations (D’Acunto et al. 2021; Weber et al. 2022). In turn, this can mean that households seemingly react differently to aggregate inflation. Moreover, systematic inflation differences among households can have distributional effects. For example, because poorer households spend a larger share of their income on food, an increase in food prices reduces their purchasing power relatively more.

This article describes the nature and sources of inflation differences for purchases of supermarket goods across a large panel of French and German households.^[2] It documents a large and persistent dispersion of inflation rates across households. “Inflation” is the aggregate outcome of many price changes in the same direction. The inflation dispersion stems primarily from two sources. First, the price changes of a given product differ across regions and, second, individual households choose different products within a product category.

Different price dynamics at the regional level

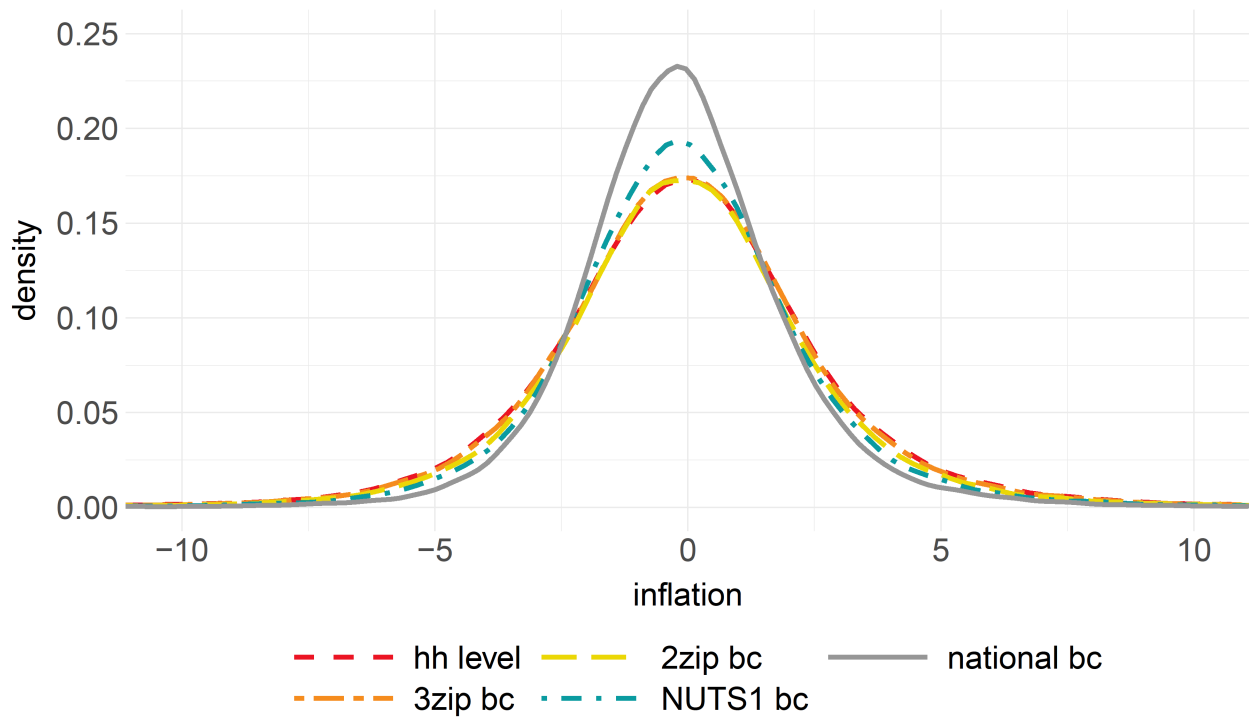
Even when households buy the same product, typically the time and place of their purchases differ and potentially also their use of rebate offers. As a result, in any given quarter households may pay very different prices for the same product and thus experience different price changes relative to earlier quarters. To examine how these differences in purchasing behaviour translate into inflation differences, we calculate household-level inflation rates. We do so using both household-specific prices and prices averaged across households residing in a given region. Averaging prices over larger and larger regions removes first the effect of household-specific price differences and subsequently also the effect of local price differences.

Chart 1

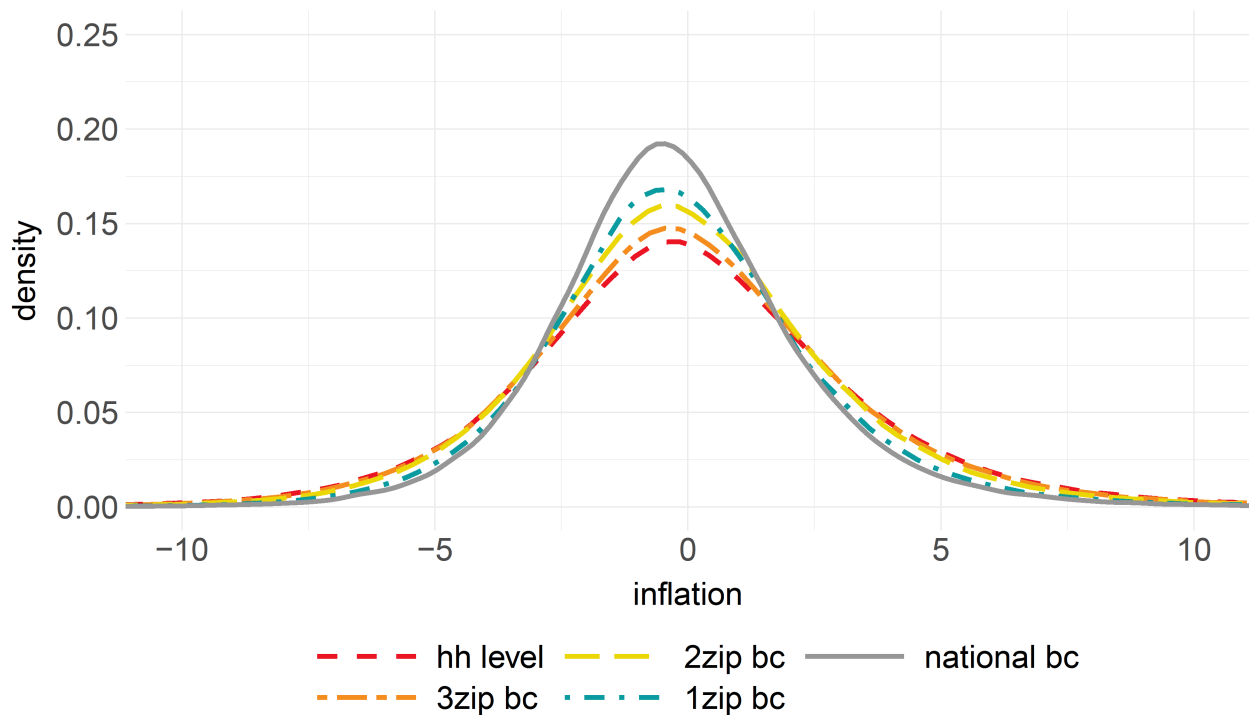
Distribution of household-level inflation rates based on household-level prices and regional prices

France (2009-18)

Density

**Germany (2006-18)**

Density



Notes: The panels show densities of year-on-year changes of Laspeyres indices for all fourth-quarter pairs in the sample pooled together. The densities are a non-parametric estimate based on a parabolic weighting function. The underlying prices are prices at the household-level (“hh level” – red lines) or averaged over three-digit postal areas (“3zip bc” – orange lines), two-digit postal areas (“2zip bc” – yellow lines) and one-digit postal areas / NUTS1 regions (“1zip bc” – blue lines), and national average prices (“national bc” – grey lines).

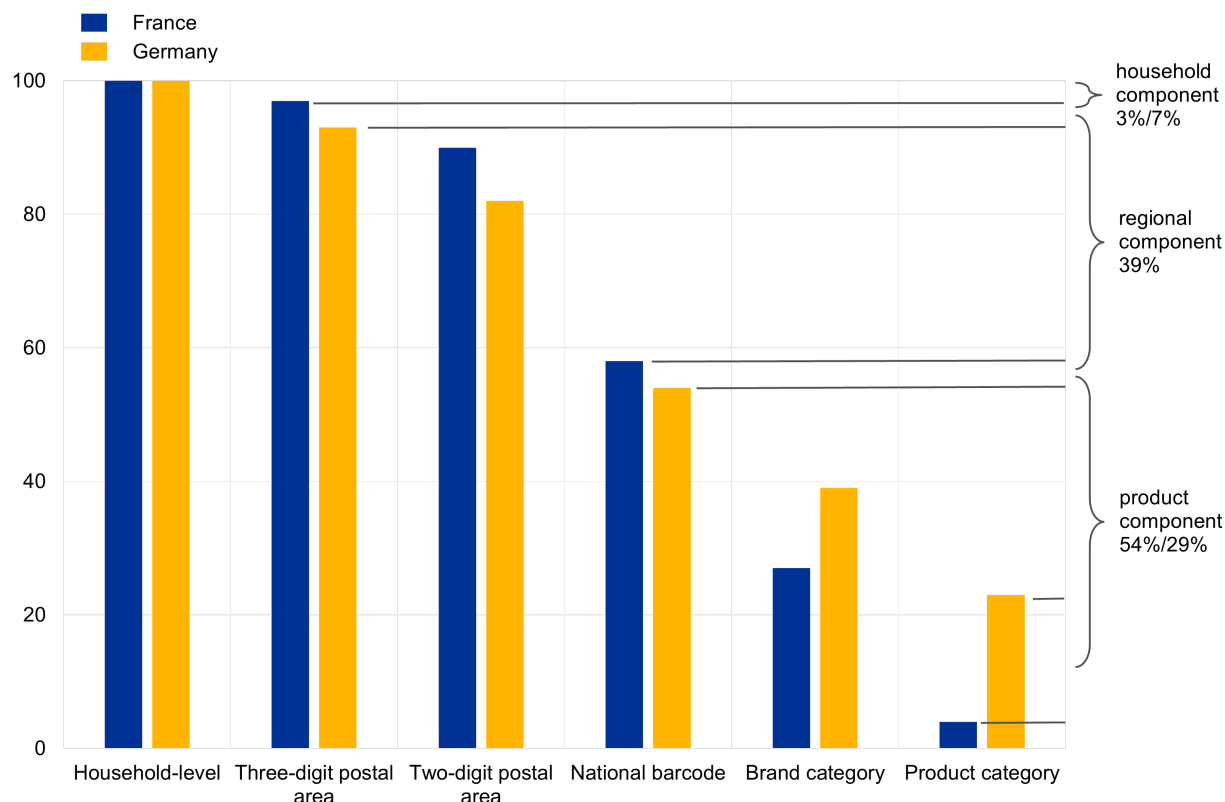
Chart 1 shows the distribution of household-level inflation rates based on (actual) household-level prices and (counterfactual) regional prices. In both France and Germany, the dispersion of household-level inflation rates based on average prices of products in smaller regions (three-digit and two-digit postal areas plotted as orange and yellow lines respectively) is very close to the dispersion based on household-level prices (red lines). In other words, differences in prices paid by specific households, which capture, among other things, use of money-saving coupons, efforts made to search out cheaper prices, and personalised offers (all for a given product), play a largely negligible role in explaining differences in inflation.

Averaging prices within larger regions results in a small compression of the distribution (blue lines). It is only when averaging for the whole country that there is a large reduction in the inflation dispersion (grey lines). The chart illustrates that differences in prices paid for the same product within a country play an important role for inflation differences. However, these price differences are mostly due to differences between larger regional units (e.g. Greater Paris vs. rural regions) rather than between individual households within a given region.

Chart 2

Components of differences in household-level inflation rates

(percentages)



Notes: Variance ratios of inflation indices based on price averages relative to an inflation index based on household-level prices. The prices underlying the inflation indices are prices at the household-level (bars 1 and 2), averaged over three-digit or two-digit postal areas (bars 3 to 6), national averages (bars 7 and 8), or averaged across products within a brand or product category (bars 9-12). Details of the calculation are described in Kiss and Strasser (2024).

Chart 2, which provides a breakdown of the inflation variation across households, illustrates this. The contribution to the total variance made by the household-specific component amounts to only about 3% in France and 7% in Germany, while the regional component contributes almost 40% in both countries.

Different product choices by households

In the short run households cannot easily switch regions to evade regional inflation differences. The main way they can adjust the inflation they experience is by their product choices. These choices differ considerably across households: the choice of which product to buy within a given brand and the choice between brands with a given quality level explain about 50% of the inflation dispersion in France and about 30% in Germany. The differences in the allocation of consumption across product categories (e.g. food vs. energy) are an important driver only in Germany, where they account for more than 20% of the total inflation variance. In the United States, by comparison, the price differences across both households and regions appear to play a more central role in the inflation dispersion than in our sample (Kaplan and Schulhofer-Wohl, 2017).

Can the differences in household-level inflation rates be traced to differences in households' behaviour or in their demographics? More than 80% of the overall variance of household-level inflation rates is due to changes over time within the households themselves, most of which are not captured by the observed household characteristics. Indeed, observed time-varying household characteristics explain less than 5% of the variation across households. Among these, the behavioural variables (such as brand choice, shopping channels, and time and effort invested in shopping) explain more than two-thirds of this systematic variation in household-level inflation rates, while demographic variables (such as household size and income) explain only a little. Income differences, for example, are not in themselves a first-order determinant of inflation differences. Nevertheless, the correlation between household income and behaviour results in significant and time-varying inflation differences between income groups.

Substitution of goods

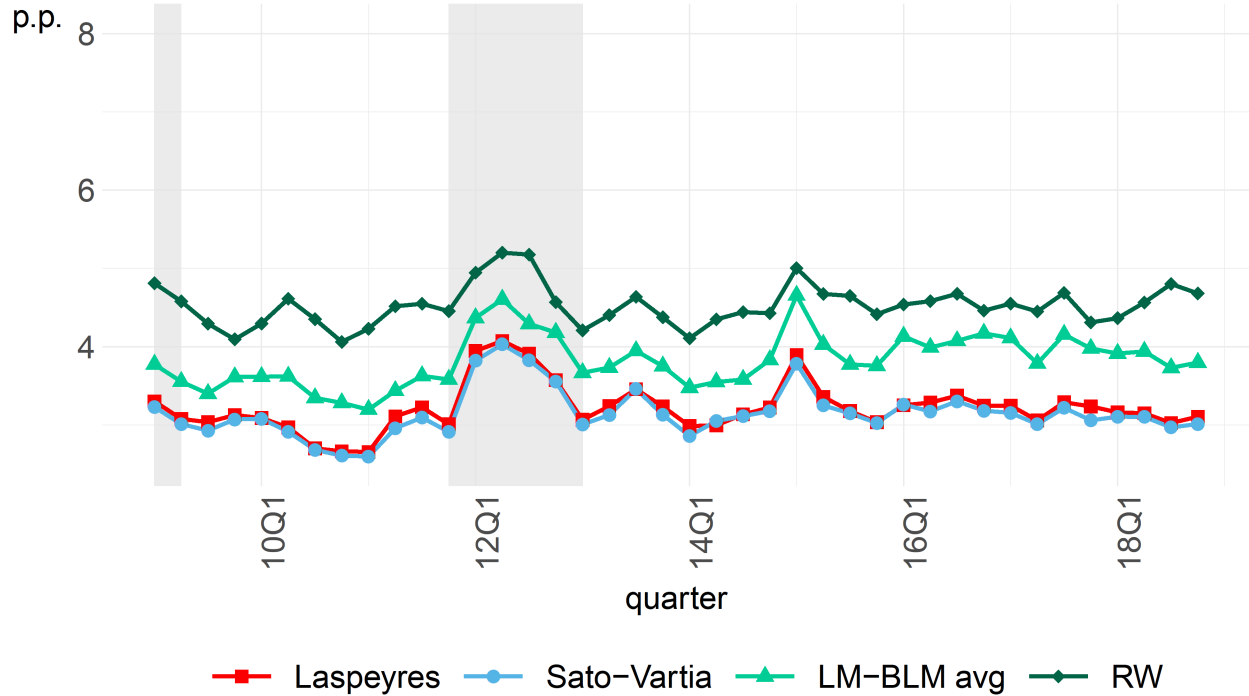
Households can offset some of the price inflation of products they normally purchase by switching to products that experience a relatively lower inflation rate. While they do indeed do so on average, they often switch to products that show a relatively higher inflation rate, i.e. products that are getting relatively more expensive. This counterintuitive pattern is not only seen for inflation rates calculated with household-level prices, but also for rates calculated with prices averaged at the product level.

Chart 3

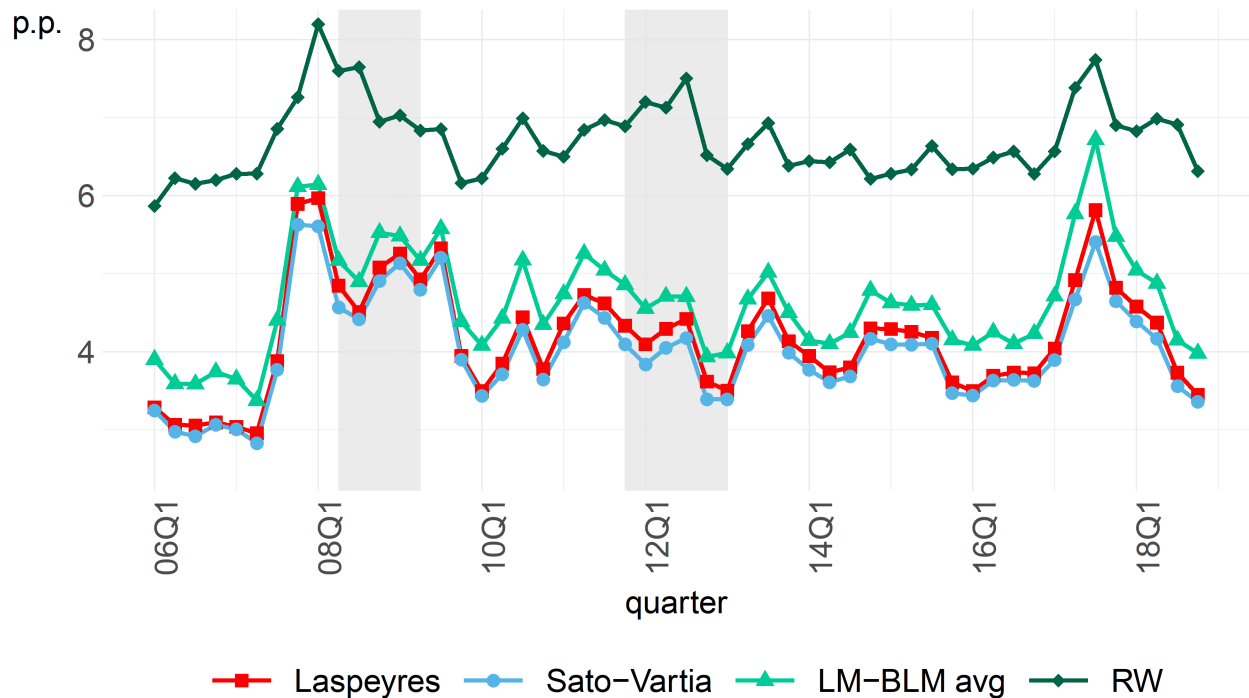
Interquartile range of a cost of goods inflation index vs. cost of living inflation indices

France

(percentage points)

**Germany**

(percentage points)



Notes: The chart shows the interquartile range of quarterly year-on-year household-level inflation indices, i.e., the difference between households in the 25th and the 75th percentile. “Sato-Vartia” denotes the index of Sato (1976) and Vartia (1976), “LM-BLM avg” denotes the geometric average of the Lloyd-Moulton and the Backwards Lloyd-Moulton indices of Martin (2022), and “RW” denotes the Redding-Weinstein (2020) index. The data cover food and beverages only and are restricted to households that repurchase at least 25 products.

Most commonly used inflation indices track the price of a fixed shopping basket, that is, of a set of goods that is held constant over short horizons. Such cost of goods indices do not take account of the ability of households to continuously switch between products. An alternative approach measures the change in expenditure required to maintain a constant level of utility. Measuring inflation by a cost of living index with constant preferences (blue line in Chart 3) instead of a cost of goods index with a fixed basket of goods (red line in Chart 3) returns very similar inflation dispersion estimates. Specifically, the effect of switching to products that are getting relatively cheaper and the effect of differing preferences largely offset each other. Allowing for changes in preferences over time, however, increases the estimated difference between households in the 25th versus the 75th percentile by more than 40% (dark green line in Chart 3).

^[3] At the household level, differing preferences across goods and over time are thus separate components of inflation differences.

Overall, the substitution of one product for another is strongly driven by household behaviour and has little to do with relative price changes, therefore, it barely reduces the dispersion of inflation rates.

Conclusion

During the recent inflation spike, inflation rates differed widely between socioeconomic groups, especially with respect to energy and other non-food inflation components (Soldani et al. 2023). Large inflation rate differences are not only seen in times of high inflation, however, and abound even within food inflation components. Households differ widely in terms of their shopping behaviour, product choice and consumption basket and therefore end up experiencing very different inflation rates for supermarket goods – even within seemingly narrowly defined social groups, such as a given low-income group. Assumptions such as common real interest rates or common inflation expectations might thus be rather imperfect descriptions of reality.

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2.

The household panels for Germany (survey by GfK, 2005-18) and France (survey by Kantar, 2008-18) cover everyday purchases at supermarkets and drugstores. These consist mostly of food and beverages, but also include some cleaning, personal care and pet food products. The data were obtained by the [Price-Setting Microdata Analysis \(PRISMA\)](#) network, a research network within the European System of Central Banks. PRISMA collects and studies various kinds of microdata to study price-setting behaviour and inflation dynamics in the euro area.

3.

When averaging preferences between two periods (e.g. by an average of the Lloyd-Moulton and Backward-Lloyd-Moulton indices as in Martin, 2022), the interquartile range widens by up to 20%. When preferences can freely vary over time (Redding-Weinstein index as in Redding and Weinstein, 2020), the range is larger (44% in France and 67% in Germany) than under the constant preference assumption (Sato-Vartia index – Sato, 1976; and Vartia, 1976).

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